

STUDIES ON THE PROGNOSIS IN SCHIZOPHRENIC-LIKE PSYCHOSES IN CHILDREN¹

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From the growing literature on childhood schizophrenia there has been emerging in recent years a clearer concept of what the term implies descriptively, if not psychopathologically and psychophysiologically. Criteria have been set up by a number of investigators (Potter(1), Lutz(2), Bradley(3), Bender(4), Despert(14)) attempting to establish an adequate basis for diagnosis to replace the preexisting confusion which ranged from denial of the existence of the syndrome in childhood to insistence on dividing the group into a number of entities with differences in nomenclature depending upon variation in the symptomatology or age level. Many controversial areas remain to be clarified, such as the relationships between childhood schizophrenia and adult schizophrenia, the significance of organic factors, the recent emphasis on "intensive" treatment, etc. The need is recognized for long term follow-up studies to throw some light on these questions; particularly since the follow-up studies to date have given sometimes conflicting results.

Although the general feeling has been that the prognosis for children who show prepubertal schizophrenia is poor, improvements and complete remissions have been reported (Creak(5), Vogt(6), Cottingham(7)). Ssucharewa and Kogan(8) found that $\frac{1}{3}$ of their cases showed substantial improvement, while another $\frac{1}{3}$ exhibited only moderate improvement. On the other hand Lurie, Teitz and Hertzman(9) and Potter and Klein(10), found that only one individual in each of their series of 10 and 14

cases respectively, was making a tolerable adjustment in the community. Their findings were more consistent with the general opinion prevailing about prognosis. In the cases we are reporting, the outlook appears to be somewhat brighter.

Our series includes 20 children who, at some time before the age of 12, experienced psychotic episodes classifiable as childhood schizophrenia. All of these cases had been studied at the New York State Psychiatric Institute and their symptoms had been evaluated in terms of Potter's(1) criteria for the diagnosis of childhood schizophrenia. These criteria include the important diagnostic points offered by most other investigators, and are:

1. A generalized retraction of interests from the environment.
2. Dereistic thinking, feeling and acting.
3. Disturbances of thought, manifested through blocking, symbolization, condensation, perseveration, incoherence and diminution, sometimes to the extent of mutism.
4. Defect in emotional rapport.
5. Diminution, rigidity and distortion of affect.
6. Alterations of behavior with either an increase of motility, leading to incessant activity, or a diminution of motility, leading to complete immobility or bizarre behavior with a tendency to perseveration or stereotypy.

The cases chosen for follow-up study offered little doubt as to their fitting into this classification, and were neurologically negative as regards evidence of focal organic central nervous system disease, at the time of the original study. The psychotic state represented a deterioration from previously higher levels of adjustment. There were 15 boys and 5 girls, ranging in age from 4 to 12 years. Their periods of hospitalization varied from 4 months to 2 years, averaging 10 months. At the time of our follow-up, a minimum of 4 years and a maximum of 11 years, had elapsed from the time of extended critical survey on the ward, the average being 8 years. The follow-up

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procedures included fairly complete psychiatric and neurologic examinations and, wherever possible, various psychologic techniques, including the Rorschach test. Electroencephalograms were taken on 12 of the 20 cases, the remainder of the group having been entirely uncooperative to the procedure. A social service survey was undertaken when the individual resided in the community. Only one patient, who lived a distance, was not seen personally by the authors. However, this patient was examined by staff members of the Syracuse Psychopathic Hospital and she has also corresponded with us.

The present adjustment levels of our series of children seemed to be classifiable into three main groups, as follows:

- I. Apparently normal adjustment in the community, educationally and socially (4 cases).
- II. Fair to borderline adjustments in the community—this includes fair or good educational adjustment with poor social adjustment (5 cases).
- III. Low grade adjustments which may be further subdivided into three types (usually in institutions):
 - (a) Typical adult schizophrenic reaction types (3 cases).
 - (b) Maintaining the same level as when originally seen, or further deteriorated (5 cases).
 - (c) Reactions as in "b" but in which an organic basis has been established (3 cases).

CASE REPORTS

Group I.—Cases much improved or recovered, including individuals who had their psychotic episodes at ages ranging from 5 to 11.

(a) Melvin was hospitalized at 5, had an acute onset of his illness over a period of 4 months. He presented a picture of fear, anxiety, motor restlessness, negativism, ritualistic movements of his hands, stereotypy, speech disturbances (mutism and echolalia), retraction of interest in his surroundings and marked intellectual retardation. These symptoms gradually improved and after a year of residence under a program of socialization and individual psychotherapy, on the children's ward, he could get along with the group and had only infrequent periods when he was underproductive and preoccupied. At home he was able to maintain his improvement and within another year was back to his former level. Eight years later, at 14, he is beyond his grade at school, has many friends and is apparently a normally integrated personality, concerned with his appearance and possibly over-

neat. He has been able to maintain this level through a series of traumatic emotional experiences including the recent commitment of his mother to hospital with a post traumatic psychosis, and the hospitalization of his brother, also for a psychosis.

(b) Roslyn was 9 at the time of her hospitalization for symptoms including fears, hallucinatory phenomena, bizarre activity and productions, periods of preoccupation and withdrawal, trembling, and suicidal attempts of one month duration. Her acute symptoms lasted about 2 months after admission to the children's ward, and within 6 months had cleared sufficiently for her to be discharged. Nine years later, at 18, she is making an excellent adjustment. She left high school in her senior year to take a job because her earnings were needed. At present she demonstrates cosmetics in a cut-rate drug store and has an active social life. At home she is occasionally in conflict with her favored, intellectually superior sister.

(c) Herbert, who had since infancy been a demanding, aggressive child, was treated at 11 for psychotic behavior of 6 months duration, marked by auditory hallucinations, paranoid expressions, withdrawal, fearfulness and bizarre behavior. He had 2 courses of insulin and was unimproved after the first course which had been interrupted because of convulsions. Following the second course he was much improved and, after discharge, a little more than a year after the institution of treatment, he continued to improve. At present, 4 years after the onset of symptoms, and 2½ years after discharge, he continues his excellent adjustment, showing normal interests in school where he is up to grade, and in friends and sports. His insight and judgment are good. An outstanding characteristic of his present personality makeup, in contrast to his prepsychotic behavior, is a lack of aggressiveness which contributes to his present ability to get along with others.

(d) Gertrude had been exposed to an extremely unhappy home life and dramatic divorce proceedings followed by living in a rigid, unaccepting foster home. By the age of 7 she became increasingly hyperactive, impulsive, sadistic, destructive and showed increasingly poorer judgment. This progressed until at 11 she had to be hospitalized. Her symptoms included bizarre activity, flight of ideas, perseveration, echolalia, echopraxia, constant grimacing and auditory hallucinations. After 6 months in the Psychiatric Institute, during which time she became worse, she was transferred to a state hospital, where she remained for 4½ years. There she showed some improvement after the first year, enough to allow a short-lived trial period with her father in the community. For the next 3 years she maintained a consistent behavior pattern marked by inadequate emotional responses, manneristic stereotyped activity, and definite evidences of delusions and hallucinations, sufficient to corroborate the diagnosis of dementia præcox. Following an attack of scarlet fever, and after puberty had become established, she improved sufficiently to allow placement in a rural home with warm, sympathetic foster parents. There her adjustment

rapidly became more normal. At present, 7 years from the time of her first hospitalization at 11, and 2 years after her discharge at 16, she has an active social life, frequently goes skiing and sleigh riding with a group of her own age and takes a large share in the housekeeping. No sign of her former psychotic symptoms are found now, except possibly for some emotional flattening, though she can be stimulated to give adequate responses to situations. Of course she remains in a relatively protected environment and has not been forced to meet stresses that city living or a work adjustment would involve.

These 4 individuals who improved seem to represent different types of childhood schizophrenia, related possibly to the age level at the time of illness. The 2 children presenting psychoses at 11 and possibly the 9 year old, showed symptoms which resembled clinically a pubertal type of dementia praecox, in contrast to the psychosis in the 5 year old child. The illnesses of the 2 older children ran a more prolonged course before recovery, 2 years and 4½ years respectively. The response of one of these to insulin might be considered an adult type of response. In the other 11 year old child, untreated by shock, improvement coincided roughly with a period of endocrine changes, including the onset of menstruation, a physiological crisis often thought of as a precipitating factor in pubertal psychoses. The onset of the illness was acute in 3 of the 4 cases. The present status of these "recovered" children has been maintained for 2 to 8 years.

Group II.—Patients who, following a psychotic (schizophrenic) period of 6 months to 3 years, have been able to make a fair to borderline adjustment in the community. This group includes children at 2 age levels: 3 at 8-9 and 2 at 12. The 3 children at the 8-9 year level were remarkably alike, exhibiting developmental disturbances and maladjustments since infancy. They showed inferior motility patterns, awkwardness following a delay in motor development, and 2 of the 3 children displayed athetotic movements of the outstretched hands, while the third had bursts of marked motor activity during which he would, at the age of 4, "run around like mad." The onset of their actively psychotic symptoms was insidious, gradually gaining momentum from the age of 4-5. All of them are now able, following a gradual

subsidence of their "schizophrenic" patterns, to continue at home with less disturbing behavior; but they are extremely dependent on over protective mothers. Two of the 3 retain mild obsessive-compulsive phenomena. The 2 boys in this group are feminine in mannerisms, dress and speech, and one has a definitely homosexual drive, one of his rituals being to touch in an unobtrusive way the genitals of men standing near him in the subway. All 3 are making good educational adjustments. Although 2 have not been able to make up the ground lost during hospitalization, they receive average grades in school, while the third is making an exceptional record in high school. The latter, in his spare time, is preoccupied with metaphysical ideas and the fine points of war strategy. Socially they all are failures. They can maintain no contact with their peers and can adjust only on a play level with very young children. Although 2 of the 3 (excluding the boy with homosexual trends) apparently have normal social drives for their age level, they are frustrated because other youngsters consider them "different," or queer.

A case typical of this trio is that of Thomas, an only child, who was a hypertonic baby, born by breech delivery, who had sleep difficulties since birth. Development was delayed, and he did not walk until 2½. Movements of the fingers were first noted at 2. He was fearful, hyperactive, impulsive, destructive and had frequent periods of negativism, sadistic behavior and rages. Habit training was difficult. Motor control was always poor and became a source of frustration when school was started at 5, leading to conflict with other children and the teachers. Gradually, at this point, he began to develop the symptoms which became full blown by 9, and which led to his hospitalization at that time, after 5 years of treatment in a psychiatric clinic. These symptoms included periods of withdrawal from contact with his environment, dissociated ideation with irrelevancy, flight of ideas, diffuse anxiety and fearfulness in addition to bursts of the same typical activity he showed earlier in childhood. The I.Q. ranged at various times from dull normal to average. He quieted somewhat on the ward but improvement was a slow process taking 3 years to reach its present level. Now at 18, 9 years after his hospitalization and 6 years after his reaching a relatively comfortable adjustment, he has developed well physically and is fond of school where he is doing third year high school work. Anxieties and fears are denied. He is anxious to indulge in sports and to have a girl friend with whom he could indulge in sex play. Although he has no friends, he is

friendly with all the storekeepers in the neighborhood and likes to amuse the neighbors' young children. He is fond of discussing classical music, politics and social questions and remembers a number of unimportant, often irrelevant details in these fields. His motility patterns, especially postural reflexes, are still distorted and his copies of Gestalt patterns show configurational disturbances.

The remaining members of Group II, 2 boys of 12, present entirely different pictures. As was noted in the older members of Group I, patterns here also resemble the pubertal or adult types of schizophrenia.

Raymond exhibited his first signs of illness at 11 when he began to show obsessive behavior which tended to withdrawal from contact with others and gradual slowing down of activity and retraction of interests. By 12 he had to be hospitalized. Affect was blunted, ideas were unrelated to each other, perseveration, stereotypy and posturing were prominent features along with general retardation and unproductiveness. The symptomatology was unchanged when he was signed out of the hospital, after 6 months residence, but within a few months at home began to emerge from his shell. This emergence was never complete, however, and at present, at the age of 17, 5 years after hospitalization, he can best be described as "schizoid." Physically he has matured. He attends a vocational high school where he does his work conscientiously, receives average to borderline grades, and is able to carry an N.Y.A. job. He avoids his classmates and teachers and has difficulty with any work that demands oral expression. The I.Q. is in the dull normal range in contrast to his normal level at 9. There is evidence of obsessive ruminations. His judgment is poor and he has no insight into his past difficulties. The picture is now one of an adolescent boy, functioning on an intellectually and socially inferior level.

Murray began to show minor neurotic traits when he started school. At 9 he developed somatic complaints for which no physical basis could be found. At 12, 3 months before admission to the hospital, he suddenly withdrew from all contacts at home and school and within a few weeks was in the midst of a frank psychotic break. On the ward he displayed paranoid ideas, was hallucinating, and appeared to be entirely out of touch with his environment. He showed no conception of time and did not seem to appreciate the meaning of words. After 6 months in the hospital with no improvement, his mother removed him and kept him at home where he has remained for the last 6 years. At 18, he is in the third year of high school, receiving grades of 30 and 40 per cent one term, and grades in the 90's the next. He has no friends and avoids all social contacts. He exhibits periods of temporary improvement so far as activity goes and in ability to get along with his family, sometimes lasting as long as six months, but inevitably he relapses and exhibits many of his original symptoms. At no point does he have

insight. The parents realize the inevitability of hospital placement but live from day to day in hopes of another temporary relief from symptoms.

Like the first 3 members of this group, Raymond seems to have reached a level of functioning, however inadequate, at which he is pegged. The other 12 year old, on the other hand, followed a course marked by relatively short remissions with recurrences of his difficulties. These last 2 cases seem never to be operating on a symptom-free basis, but with a patched up, distorted type of personality integration. The mental scarring is reflected on all levels of their adjustment. In contrast to the first 3 cases in Group II, the onset in these latter 2 cases was relatively acute. None of the cases showed insight, even in their best periods.

Group III A.—Children who are unimproved and now present syndromes typical of adult schizophrenia. Here we consistently find a different symptom picture in the prepuberty period as contrasted with the present pattern. In 2 of the 3 members of the group the onset was at 3 years with recovery from the first attack, but with rapid deterioration following the second episode at 5 and 6 years of age. Both of these children are in institutions for mental defectives.

Marvin, age 6, deteriorated over a period of almost 2 years at the Psychiatric Institute to infantile levels of behavior. At 12, after 4 years in the state school for defectives, he began to respond to stimulation and motivation and relearning, to dress and feed himself and care for his toilet needs. At the same time his symptomatology slowly changed to a silly, incoherent, delusional type until now at 18 he is reacting with a typical adult, dilapidated, hebephrenic behavior. At times he seems to believe that he is a dog, barking, snarling and baring his teeth, walking on all fours, jumping on others and tearing their clothes, and even his own, with his teeth. No contact with him is possible. Rarely he repeats the last word of a question asked him, but that is the limit of his speech. He occasionally hums the same tunes he did when first seen at 6. Periods of hyperactivity persist. Physically he is immature.

Similarly, John, the second in this subgroup, whose rapid regression took place at 6 years of age, had a relative remission at 14, during which he was able to adjust to the Seguin class at the state school, but within 3 months began to show pronounced catatonic features. At 16 he presents the type of catatonic syndrome found most often in adult schizophrenics, with periods of waxy flexibility, posturing, mutism and irritability and at

times requires tube feeding. When he accepts candy he holds it next to his genitals.

The last member of this subgroup, Richard, began to show obsessive-compulsive behavior at 5 following an attack of pertussis. He had numerous fears and tics, insomnia and made buzzing noises extremely annoying to others. He reached a peak of abnormal behavior at 10, with seclusiveness and bizarre ideas. When, at that point, he was studied for 9 months at the Institute, it was felt that he was a case of childhood schizophrenia with hebephrenic features. An encephalogram showed a minimal ventricular dilation on the left side. In a state hospital he was relatively quiet and symptom-free for 4 years. Shortly following his transfer to another state hospital, at 14, he suffered an exacerbation of all his former manifestations with more marked withdrawal from reality, inappropriate affect, diffuse anxiety and scattering of ideas, suggesting a more definite hebephrenic state. This lasted about a year and then subsided leaving him with considerable intellectual deterioration but able to work in the institution on small jobs at 21.

These 3 individuals all developed more adult-type schizophrenic patterns in their behavior and activities after a period of relative freedom from symptoms early in adolescence. The implication inherent in this change is one of growth, and in a sense shows a greater maturity of reaction to the disease process.

In *Group III B* (the 5 children who maintained the same level as when originally seen or deteriorated further) the onset of illness was acute in each case. In 3 of the 5, the symptoms occurred abruptly in early childhood at 3 to 4½ years of age, interrupting normal or even superior growth and development. In a fourth case there was a short-lived episode of mutism and withdrawal at 3½ years, with complete recovery until the age of 10, when a second acute attack resulted in rapid regression and within 18 months he had reached the level which he still, 11 years later, maintains in a state hospital. The last individual in this class had been a shy, "model child" until 11½ years old when, within 6 months, he deteriorated to a low level. Although he is the only one of the group who, at the age of 17, is living in the community, this is only because he has a male nurse in constant attendance and is under continuous sedative treatment, including packs and hydrotherapy.

Even though flashes of mild improvement occur in these individuals, the common de-

nominator is still the little better than vegetative state they are in. None of them, now ranging in age from 10 to 22 years, can fully dress himself; only 2 take care of their personal needs, 4 of the 5 are mute and usually out of contact, and the fifth never talks spontaneously; when he is spoken to, his responses indicate a good deal of confusion and disorientation with marked speech difficulty. Characteristic also of these individuals is the infantile mode of activity, including smearing of feces, preoccupation with saliva, aimless genital manipulation, occasional outbursts of irritability, combativeness and destructiveness (except for one always amiable, tractable child). Two of this group show primitive sucking and grasping reflexes, and with one exception, the postural reflexes are primitive in pattern and marked by a whirling tendency. Otherwise, the entire group shows no other clinical neurological abnormalities. Air encephalograms performed on 3 of the children were all negative as were electroencephalograms (see below). A striking feature of this group was their physical immaturity, none having progressed very much from the time of original study, even in the development of secondary sexual characteristics.

In the last *Sub-group, III C*, we placed 3 children who had made no progress in adjustment since hospitalization, but who, on follow-up study, revealed organic neurological pathology which had not been in evidence at the time of the original studies. At no time from the onset to the present was their course and symptomatology distinguishable from that of the individuals in the preceding group, even in the periods of remission.

Renée, who was observed at the Institute for 2 years, beginning at the age of 7, had a sudden onset of her difficulties at 2½. Shortly after a series of illnesses including pertussis and mumps, she stopped speaking, became markedly hyperactive and destructive. This became progressively worse until a plateau was reached at 12, by which time she was in "perpetual motion," had temper tantrums over trivial things, touched, threw or destroyed everything she could get hold of, was fearful and anxious, had defective speech, masturbated openly, and when finally quieted would be indifferent to everything about her. At 17 she is on the disturbed ward of a state hospital showing little appreciable change in behavior. However, on examination she

presents stigmata of a postencephalitic state, including some signs of Parkinsonism. She shows a tendency to maintain a hunched posture, a suggestion of propulsion, mask-like facies and at times jerky movements of her arms.

Both Joseph and Jerry had shown similar pictures on entrance to the hospital, including loss of speech, increase of activity, combativeness, fearfulness of other children and activity dictated by distorted ideation. Joseph's difficulty had an acute onset at $3\frac{1}{2}$, while Jerry's symptoms, except speech, had been progressive since birth. Both were neurologically negative when studied and air-encephalograms showed no gross deviations from normal. After discharge Joseph developed "fainting spells" occurring at intervals of a few months to a year and lasting 3-6 hours. He has continued to display all his symptoms. Jerry, too, about 2 months after leaving the hospital had a convulsion, predominantly left-sided, and has continued to have them at irregular intervals since. His symptoms were relieved to the extent that he recovered his speech and is able to attend ungraded class but he is still fearful, irritable, combative, distractible, has flight of ideas, and it is difficult to make contact with him. Severe headaches and dizzy spells are frequent. At 13, 5 years after hospitalization, he shows only "soft" signs neurologically, such as athetoid movements of his hands, over-reaching for objects, awkward gait with exaggerated movements and distorted postural reflexes with the pronator sign, and drifting of the right arms outward, when the head is turned to the left. Joseph at 12, 7 years after he was first seen, is too uncooperative to allow an adequate neurological examination, but that he has definite motility disturbances is quite evident. Electroencephalograms on both youngsters were abnormal, showing evidence perhaps of organic CNS change (see below).

Possibly the individuals in both Groups III B and III C, bankrupt as they are in almost all fields of functioning, can best be understood in terms of the "catastrophic reaction" described by Goldstein (18).

DISCUSSION

It is obvious from the outcome in the cases we have followed that a wide range of adjustments from the childhood schizophrenic process is possible, varying from apparently complete recovery (20 per cent) to almost as complete disintegration of personality (25 per cent). We have come to feel, with Bender (14), that these individuals have shown disturbances in every field of integration, including the vegetative, motor, perceptive, intellectual, emotional and social spheres. In their premorbid personalities, very often, there had existed from infancy

some distortion in one or more of these spheres, and with this pathology as a focus there was a spread with the development of the overwhelming disease process, to include all the other levels. In those in whom this total invasion receded there was still left the preexisting focal defect. Often it was aggravated and sometimes accompanied by milder distortions in the other areas. This is particularly true in the patients in Group II. Those cases on the other hand which recovered sufficiently to fit into Group I had no history of severe disturbances in any of these fields prior to the onset of the psychotic state and were left with only minor defects, where any at all are in evidence. The type and degree of disturbance in these different fields of integration seem on closer scrutiny to have some correlation with prognosis. It might be profitable, therefore, to examine each field individually.

In evaluating the effect of changes in the vegetative sphere the most striking factor that one meets in comparing the members in the 3 groups is that all those who had remained in a seriously deteriorated state, Group III B, were physically infantile even at the present age range of 13 through 22 years. This includes the failure of development of secondary sexual characteristics or no progress beyond the immature level present at the onset of the psychosis. This is in contrast with those who had made any degree of recovery (Groups I and II) and those who had gone on to develop an adult type of schizophrenic psychosis, all of whom had matured physically to age. We could find no definite relationship between Kretschmerian body type, course and outcome of the illness as had Ssucharewa and Kogan (8) who felt that dysplastic and asthenic individuals in their pre-psychotic make-up had a poor prognosis.

Autonomic nervous system function in some of the childhood schizophrenics is distorted. A battery of autonomic tests is being applied at present to a group of schizophrenic children, but final interpretation of the results must wait on the completion of normal standards for comparison. Indications are, however, that schizophrenic children show characteristically a marked variability in response, ranging from normal on one day to

extremely immature patterns on another. However, the most seriously deteriorated patients where testing was possible showed consistent immaturity of reaction in such measures as parotid secretory rate. Thus these measures may be thought of as indicators of levels of adjustment. It is not yet clear whether these changes are secondary phenomena, reflections or resultants of disturbance in physiological balance or whether they are of primary underlying import. Clinically too we can confirm evidences of vegetative disturbances found by Grebalskaja-Albatz(11), including pupillary changes, changes in skin temperature and moisture. If we translate these results showing immaturity or maturity of autonomic response into terms of prognosis we find objective evidence for Ssucharewa's(12) speculation that physiological processes can compensate for the defect caused by the destructive disease process. However, this can only be the case where there is maturity of physiological activity.

Disturbances of motor integration are common, as we have seen. In one group of children the motor disturbances dated from birth and persisted even after a degree of recovery from the distortions in other fields (see Group II). Motility patterns were particularly and persistently abnormal in those cases with organic brain involvement. Postural reflexes (Teicher(13)) used as a measure of pathological motility were not abnormal in those who had made apparent recoveries. However, they remained primitive to a mild or severe degree in most of the members of Group II and in all those who failed to improve. Among the latter the whirling tendency noted by Bender(4) was consistently present.

One of the disturbances in the emotional sphere, which has been postulated as having a bad prognostic significance, is anxiety (Despert(14) and Ssucharewa(12)). We have found this to be true only in those of our cases where the anxiety is associated with resignation and an attempt to hold on to reality by trying desperately to prove this hold to themselves and to others. On the other hand, anxiety associated with a withdrawal, while the personality collects its resources to combat "the disorder which has

distorted all of its inner experiences," would seem to be a much more hopeful sign and is found in 3 of the 4 cases in Group I.

The deviations from normal in the intellectual and perceptual fields, when analyzed from the point of view of the psychological test performances, would also seem to have some prognostic implications. A genuine, although inadequately manifested interest in the environment on the part of the children who later improved (Groups I and II) was indicated also in their willingness to cooperate during the psychometric examination and by their interest in their test achievement. These children were not able to sustain the voluntary attention required or they actively rejected the test situation apparently for fear of failure and not because of indifference. The children who remained unimproved and were placed in Group III did not show any active interest in their test achievement; neither did they display any active negativism but just indifference. Thus there was a marked difference in the degree of active responsiveness to the environment, either positive or negative, between Group III and the other groups.

To summarize those points in the psychometric data which would seem to be of prognostic value, the following criteria may be postulated:

- (A) The prognosis is favorable if the Stanford Binet I.Q. is 70 or above.
- (B) The prognosis is unfavorable if the Stanford Binet I.Q. is below 70.
- (C) The prognosis is unfavorable if the child is consistently mute, cannot carry on a conversation and cannot cooperate on the general intelligence, verbal tests even though it cooperates on the performance tests.

These criteria help to differentiate between our improved and unimproved children: all of the 9 improved cases (Groups I and II) had Stanford Binet I.Q.'s above 70; one of the unimproved had an I.Q. above 70 but 5 had I.Q.'s below 70; the remaining 5 of the 11 unimproved (Group III) were mute. However, since the total number of cases is only 20, some doubt concerning the reliability of the prognostic criteria remains.

A Stanford Binet I.Q. is acceptable as an element in prognostic evaluation if the child's cooperation is satisfactory and the examination is completed. Needless to say, no as-

sumption is made that the obtained I.Q. is a valid indicator of the child's initial or highest potential intelligence. It appears as if the schizophrenic child with a good prognosis is not disturbed intellectually to such a degree that its Stanford Binet I.Q. falls below 70, providing of course that the premorbid I.Q. exceeds this figure. Apparently "psychoses occur in persons of all mental levels, but perhaps more commonly in persons of somewhat inferior intelligence" (Brody (22)). In other words, the resistance to the schizophrenic disease process seems to have been more successful when the child's I.Q. remained above 70. The psychometric results obtained during a psychosis cannot be considered as valid measures of the prepsychotic intellectual level although they frequently indicate the child's level of intellectual functioning for many years after the onset of the psychosis (Piotrowski(20)). None of our children seemed able to do their best during the psychometric examination. The Stanford Binet records of our children—except of the mute ones who could not cooperate—show, without exception, the "objective signs of invalidity" (Piotrowski (21)). This is true of both the improved and the unimproved children's records which, as was anticipated, implies that the "objective signs of invalidity" do not discriminate between the reversible and the irreversible Stanford Binet deviation from the initial, pre-morbid intellectual level.

The psychometric pattern, more exactly the relation between the verbal test and the performance test scores, is not without interest and can be used as a secondary prognostic criterion, strengthening the prognostic impression derived from the primary, more discriminating criteria (A), (B) and (C). Only 2 of the 9 improved cases received lower scores on the performance than on the Stanford Binet tests, while only one of the 6 non-mute unimproved cases received a higher score on the performance than on the Stanford Binet tests. Two unimproved and 2 improved cases obtained the same scores on both the verbal and the non-verbal tests, *i. e.*, the difference between the scores was not greater than one year. The performance tests used were the Merrill-Palmer, the Arthur and the Pintner Paterson. The

significance of the discrepancy between the verbal, general intelligence and the performance tests, including the Goodenough, has long been recognized (Brody(22)). Schizophrenic children are only another instance of the validity of the general principle that marked intellectual inefficiency is indicated if the performance tests score is one or more years lower than the general intelligence test score.

It is now evident from the follow-up data that those children who were able and willing to cooperate during the Rorschach personality examination have improved; those unable or unwilling to cooperate remained unimproved. Of course, failure to give interpretations of the Rorschach cards cannot be taken as an unfavorable prognostic sign because children are known to refuse to interpret inkblots for a variety of reasons. It must be added, however, that the previous conclusions based on the Rorschach findings in schizophrenic children (Piotrowski(20)), although still found to be reliable, apply only to schizophrenic children with a good prognosis. There was no opportunity to repeat the Rorschach examination in all cases; the number of records is too small to permit any reliable conclusions concerning the change in personality as they might be revealed by the Rorschach findings. Two of the unimproved patients (in Group III A) cooperated on the Rorschach during the follow-up; their Rorschach records do not differ from records of other adolescent or adult schizophrenics.

The electroencephalograms bore no definite relationship to the character or severity of the clinical states. However, where gross organic involvement of the brain was demonstrated by clinical and air encephalographic examinations, consistent associated abnormalities were noted in the electroencephalograms. Two members of Group I, who had made better adjustments than the rest, had abnormal or borderline normal electrocortical patterns, including occasional bursts of serial 3-5 cps waves, more marked on hyperventilation, associated with high incidence, well organized alpha activity. In Group II there was usually a diffuse type of abnormal electrocortical activity of mild to moderate severity and marked by irregularities in fre-

quency and wave forms. One case had some asynchronous activity with more beta waves on the left than on the right. In Murray, who showed frequent relapses, the pattern was one of well organized alpha activity occurring in irregular bursts of irregular length much like the type found in hallucinating adult schizophrenics. In all the individuals in Group III B, maintaining deteriorated levels, there was no sign of definitely abnormal electrocortical activity. Characteristic of most of the records in this group was an almost continuous high amplitude alpha rhythm over all regions. This is also often seen in advanced deteriorated adult schizophrenics with marked affective blunting, and in some mental defectives. In the organic cases, with convulsive phenomena, evidence of abnormality in the EEG included complete disorganization of activity with marked irregularity of pattern and random slow waves. In the case of Jerry the slow waves were more marked on the right than on the left and were chiefly precentral, parietal and occipital in distribution.

The occurrence, in the presence of demonstrable CNS disease, of symptoms and personality changes identical with those characteristic of childhood schizophrenia, points to the schizophrenic syndrome in children as being non-specific. It is this non-specificity which has led many to postulate that dementia infantilis, dementia praecoxissima, etc., are not varieties of childhood schizophrenia because they have found neuropathological changes in their cases. Schilder(15) takes the middle road, coming to the conclusion that "pictures which resemble schizophrenia in childhood are very often not schizophrenic but organic." Bradley(3) does not make the two conditions mutually exclusive when he says "a great deal of evidence is available that certain other disorders may co-exist with schizophrenia, some of which may be accompanied by physical signs which should not be allowed to cloud the picture." He includes in these epilepsy, mental deficiency and organic brain damage. To obviate this disagreement we might use the formulation suggested by Bromberg(16) and Kallmann(17), that of "true" or "genuine" childhood schizophrenia and "symptomatic"

schizophrenia in childhood. Theoretically when certain levels in the brain structure are attacked by some process, as yet unknown (possibly organic in nature), there is obtained a picture of "true" childhood schizophrenia. It is possible that when the same levels in the brain are affected by an organic process, the nature of which we can recognize, it results in what is known as "symptomatic" schizophrenia although the clinical picture is the same.

When we try to trace the relationship between age, type of onset and outcome, only one fact stands out. Four out of 5 of those children who remained in an advanced deteriorated condition had an acute onset early in life (3-5 years of age). This is in accord with similar observations (Lutz(2), Grebalskaja-Albatz(11)) except that in this series acute onset in itself had no prognostic significance (note the acute onset in 3 of the 4 children who made the best recoveries—one, in fact, had his first symptoms at 5). Acute onset at an early age was also noted in 2 of the 3 cases showing adult schizophrenic symptoms. These cases fitted the criteria for Heller's disease (relation between dementia infantilis, childhood schizophrenia and adult schizophrenia?).

The insidious type ended, in our cases, in 1 out of 4 excellent adjustments, 4 out of 5 borderline community adjustments, and in 2 of the 3 cases showing adult schizophrenic symptoms. Age in itself, except as above, had no apparent relationship to prognosis.

With the exception of 2 cases, those we are reporting were studied before the current shock therapy methods were available. These 2 cases were treated with insulin; one recovered following his second course and the other was unimproved. Recoveries or remissions showed no definite correlation with any type of treatment, direct or indirect, although the relation between direct psychotherapy or environmental change in individual cases seems evident. In half the cases found to be doing best on follow-up, recovery or remission was apparently spontaneous, in one case $4\frac{1}{2}$ years after the height of the psychosis was reached. Not one of the "recovered" patients had insight into former symptoms.

We have attempted in this paper to sketch a somewhat longitudinal picture of what happens in childhood schizophrenia. This is still not the final picture and these studies will be carried further.

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DISCUSSION

LEO KANNER, M.D. (Baltimore).—This carefully prepared study carries us a considerable step farther in our knowledge of childhood schizophrenia. The cases were well chosen. This in itself is a highly significant prerequisite in any such investigation. Much too often the abundantly increasing collection of cases is cluttered with descriptions which have little relation to any, even approximately fitting diagnostic criteria. The authors of this presentation have not only sifted their material with the necessary caution but, at least in the title of the paper, have indicated that they do not feel too secure in drawing close analogies between childhood and adult schizophrenia. Some of us will even find it rather difficult to refer any of the cases just reported to any of the particular classical pictures of childhood schizophrenia. I doubt very much that the name of Heller and his dementia infantilis could be invoked with regard to any one of the cases in Group III A, as the authors have done. But this, I realize, is a relatively unimportant point, since it is directed more toward the matter of terminological subgrouping than toward the intrinsic merit and aim of the study. The main feature remains that, in contrast to some of the

previous follow-up investigations, this one rests on the safe premises of the selection of diagnostically non-controversial cases.

It is heartening to learn that, at least for the duration of the follow-up interval of between 4 and 11 years, as many as 21 per cent of the patients have shown a remarkable readjustment in all spheres. This is a much brighter picture than has been hitherto assumed to exist. I have myself come upon a number of children whose difficulties very early in life gave the impression of schizophrenic-like disorder, with very marked disturbance of affective contact, anxiety, and obsessive-compulsive behavior. In the course of years, they were able to establish a workable relationship to people, the anxiety faded away, and varying degrees of obsessiveness remained as the chief obstacle to smooth adjustment. All of these children started out with every evidence of dire prognosis, ranging from the assumption of profound feeble-mindedness to the prospect of a Heller type of deterioration.

The authors have rightly availed themselves of the advantages of some of the modern criteria for evaluating background and progress, such as electroencephalography and the Rorschach tests. The

question of the value of shock-therapy still remains unanswered.

The authors deserve commendation for this painstaking and careful piece of work. I hope that they will be able to carry out their promise of further investigation.

HENRY B. ELKIND, M. D. (Boston).—A prognostic study from a statistical standpoint of a medical condition requires among other things that that condition should be well understood, that there should be little error in diagnosis, that outcomes should be readily categorized, and that the number of cases be large enough to provide significant conclusions.

Taking up the last requirement first, it should be borne in mind that large samples may not always be available where rare medical conditions are concerned. Schizophrenic-like psychoses in children are relatively rare and the sample studied by the authors is in a sense a large sample. Also their cases have been exposed to careful intensive study by competent persons and in a single institution highly organized for research. This makes this sample, although small, a valuable one for the purpose of prognostic study. The authors also have been careful to compare their sample with other samples of similar cases, which is extremely necessary where small samples are involved. This study is additionally valuable in that it represents a follow-up study of anywhere from four to eleven years of all the cases studied.

As to the first requirement, that the condition be well understood, the authors themselves recognize that in the present state of knowledge of schizophrenia and schizophrenic-like psychoses, there is considerable lack of understanding or information as to the essential nature of this group of psychoses.

As to the second requirement, that there be little error in diagnosis, the authors have gone to considerable trouble to see to it that their cases fell within the category of schizophrenia and schizophrenic-like psychoses. But I question whether psychiatrists can feel certain about this at the present time. The authors do not feel too sure.

The third requirement which a statistical prognostic study insists on is clarity as to outcome categories. In the present study there is found a considerable haziness as to the boundaries of these categories, as, for instance, between recovery, improvement and unimprovement. The paper con-

tains numerous vague statements as to the limits of these categories. For instance, in their Group I, where they have placed their cases which to all practical purposes have recovered, they are not sure that 2 of the 4 cases may not be manifesting remissions at the time they classified the cases.

The electroencephalographic studies seem to be somewhat helpful, although unfortunately only about 75 per cent of these had such studies. In the recovered group, these seem to suggest in two cases, that the psychotic disturbance may be a transitory condition at peripheral levels rather than at deep levels.

No definite prognostic criterion, except possibly one, seems to have developed definitely out of their study to my mind. Even such items as onset and type of onset do not seem to have any specific significance as to prognosis. There seems, however, to be one established criterion: that the more serious and persistent the disturbances in the personality segments of the child during the prepsychotic period, the more ominous is the psychosis which ensues. Of course, this criterion is rather difficult to establish in very young children and it did not apply in every single case. But to my mind it seems to have been present in most of the cases and has definite prognostic value. It is interesting that the electroencephalographic studies suggest that the schizophrenic syndromes in these children are of a non-specific character. This leaves one feeling that the cases studied in this paper may represent a heterogeneous group of psychoses, particularly if one insists on using *causation* as a necessary criterion for classification. One might question from nosological considerations the inclusion of those three cases in Group III where the electroencephalographic curves indicate definite organic disease of the brain. In addition, one has to bear in mind, in regard to these curves, that one is never sure, outside of the organic cases, whether the non-specific organic conditions which they suggest are causes or effects of the fundamental psychotic disease. In conclusion, I should like to offer my appreciation of the authors' effort to traverse and investigate a very difficult field and I wish to congratulate them on their conservative attitude in regard to their findings and on their enthusiasm which impels them to make further studies. I am sure that when they have gone on much further they will undoubtedly bring order out of chaos in this most interesting field.